

# LISTing

## Newsletter

Newsletter of the  
Long Island Sinclair/Timex  
Users Group  
.....

NOVEMBER 1987

Incorporating NYTSE

Price \$1.50

Next meetings: December 13, 2PM at Harvey Rait's home. This will be the swap meet buy sell and trade for goodies! Also, hear a demo of the RS232 Speech Synthesizer (QL Talker). And possibly even meet 'the man from Timex'! The NYTSE meeting will be Monday, Dec. 14, 7PM at Miss Kims, Park Ave. South. Call Myles C. for more info: 212-427-0179.

Coming soon in LISTing:

"A New Computer for \$27.50"? "Fitting it Under the Hood on the ZX81", "POKEing Around in the 2068"...and Much More, for the QL too! So keep on reading LISTing! (Renew subscriptions to keep it up)

L.I.S.T.  
5 Peri Lane  
Valley Stream, NY 11581



TO:

Don  
3310 Clover Dr S  
Cedar Rapids

Jan-88  
Lambert  
IA  
52404

FIRST CLASS MAIL  
DATE MEETING NOTICE  
Please DON'T delay!

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=====
|           LISTing Listing           |
| Please send submissions to:         |
|   Joe Newman, 325 W. Jersey St.,    |
|   #2D, Elizabeth, NJ 07202          |
| or send items for the LIST group    |
| to: LIST, Harvey Rait               |
|   5 Peri Lane                       |
|   Valley Stream, NY 11581           |
| PLEASE NOTE THE NEW LIST ADDRESS    |
|   yearly LIST dues- $15             |
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### Newsletter Newsnotes

First of all- THANK YOU! to all of the people who have sent in articles and nice comments. It's some good stuff! Of course I can't print all of it, in one issue, so if you don't see your article in the next issue or so don't despair- it will probably be printed.

Lots of stuff is going on lately...and it's great for all of us TS holdouts! First, don't forget that the next LIST meeting is the BUY - SELL - SWAP meet! The second Sunday of December, be there, make money selling old stuff, then spend it buying other old stuff!

Second, Stoney M. made a very interesting announcement at that last meeting. Stoney said he called Psion (in Conn.) after seeing a half page ad for the Organizer II in the Wall Street Journal. Being his usual cool self, he asked how an Organizer can be hooked to a Sinclair QL. The person on at Psion stated there was another person at Psion who worked with Sinclair for '20 years'. Stoney realized this number wasn't accurate, but spoke to the gentleman. He then found out that this man, Bob something, worked for Timex...in research yet! Stoney then proceeded to have a nice chat with the man and ended up inviting the man to a LIST meeting to speak about the Organizer. Of course behind the scenes brain work was going on...the guy agreed to come to a meeting! We'll let him demonstrate his organizer, then we'll zap him with all those questions we have about 'what really went on at

Timex'!! It should be great, so make sure and come to the meeting.

At the present time, Stoney we'll try to have the man attend the December meeting. If he can't attend then hopefully he'll attend the January or February meeting. Stay tuned for further details. To make sure you don't miss him, just come to all the meetings!

On the ZX81 horizon- Fred 'ZX81 Genius' Nachbauer has introduced ZX-Term 80, an 80 column terminal program for the ZX81. It features XMODEM file transfers along with an 80 column screen! Yes- on the ZX81. Hopefully someone will prepare a review for the newsletter.

Speaking of telecommunications, TSX-64 should be available now for the 2068. This is a new 2068 BBS program, written by that 2068 BBS Master Kurt Casby. It features what many have asked for- compatibility with a non-memory resident disk operating system. The best news is that the program can work at 1200 BAUD, using an RS232 board, like the Z-SI/O. With the 2050 it is only 300 baud. Of course XModem file transfers, multiple individually controlled message bases, and more features are available.

TMX-64(\$35) as well as ZX-TERM\*80(\$25 requires non-volatile board), the Z-SI/O(\$79) and Specterm 64 (now on disk) are all available from Grey & Clifford Computer Products, P.O. Box 2186, Inglewood, CA 90305. Phone: 213-759-7406. \*\*FLASH- G&C have several products on sale (including TMX-64 until X-mass...call or write them.

While still on the subject if BBS's I'd like to announce that I'm currently working on a 2068 BBS also. This is another rewrite of Tinyboard except that all the BASIC is being rewritten to use the TIMEX disk drives. Using the Timex's random access file handling, there is no need to have messages stored in RAM. What this means is that I have almost the ENTIRE 2068 memory to STUFF features into!

At the present time, my program has a users log with each user able to choose his/her own password. Why do they need passwords? To read PRIVATE messages they get...yes, the program even has private message capabilities I believe this is the FIRST time these features have been incorporated into a 2068 BBS program! Number of messages, message lengths and number of message bases is limited ONLY by the amount of disk space available. If anyone is interested in this type of BBS, call or write to me.

And one final word on BBS stuff- the thing that can make it all happen- the MODEM!! Megatronics, winner of a Computer Shopper Best Buy award, has a user group special on Avatex modems. These are good modems, and they come with nice packaging and a good ENGLISH manual (not translated into slang!). These are RS232 modems, for use with the QL or a 2068 with an RS232 board. The Avatex model 1200 is only \$75, and the Avatex model 1200HC, which is 100% Hayes compatible is \$99. These are excellent prices, and to get them you must write on your order that you wish to obtain the USERS GROUP SPECIAL, and include the name of the group (LIST). Megatronics can be reached at 1-800-232-6342. To order by mail, you can write Megatronics, Inc., P.O. Box 3650, Logan, UT 84321.

\*\* A & J Microdrive NO MORE! \*\*

IMPORTANT: A&J Microdrive, now known as A&J Assembly, will no longer supply microdrives. The reason is that they can no longer obtain the cartridges. At the time of writing this, A&J only has about 80 cartridges of certain types left. Variety Sales is sold out of cartridges and will NOT obtain more. If you wish to get cartridges, start buying those used ones, or call or write A&J at:

A&J Assembly, 2842 Aiello Drive, Suite C, San Jose, CA 95111. Phone: 408-281-0100.

TS-2068 Up-Date News

The new quarterly update for 2068 users (formerly known as TS-2068 Safe Disk Update) is doing rather well. The subscriber mark was past 100 and growing at the end of October. The issue I have seen, while containing much info for users of the JLO disk, was still rather good- about 38 pages of hints, tips and techniques. Bill Johnson, the newsletters creator, is dedicated to bringing 2068 users a quality publication. Bill states "I have sufficient resources to withstand start up losses and I will not quit!"

Bill has some good plans in the works for the future- including a BBS with an evening 800 number and eventually going bi-monthly. To find out more or to subscribe write:

TS-2068 Up-Date  
1317 Stratford Avenue  
Panama City, FL 32404  
Subscription cost is \$12/year.

IT Talks back!

Now you can make your computer talk back to you- with a speech synthesizer. These are professionally made and cased devices which can work with any RS232C computer that can be hooked to a modem (i.e.- SER2 of the QL). While sounding just like you would expect a computer to sound, they are fun to use...and very easy to use as well. Just plug into the serial port, plug the included power supply into an outlet, and turn on the power. The units will announce their presence with an O.K. Then just open a channel to the serial port and PRINT to it- yes, text to speech is all there is to it!

So what's the cost? These units originally sold for \$69, but you can order one from now until X-Mass for only \$35, which includes postage. After that, they are \$39 (I believe) which is still a bargain, considering the chips for the speech cost about \$30 alone. *NOTE: They come with a QL Connector... for RS232 cable (DB25) add \$3.*

Order from:

Richard Moldovan, 7414 East Cuernavaca Place, Tucson, AZ 85710.

16K - FITTING IT "UNDER THE HOOD"  
FOR THE TS-1000, ZX-81 OR PC-8300

Almost all users of a ZX-81 type computer have some sort of "Ram Pack" attached to the back of their machine. The major disadvantage of these devices is "Ram Pack Wobble". Even after curing this problem with clamps, screws or new cases, the extra circuitry degrades the video display, strains the computer's power supply and often the only edge connector available for expansion. Modifying your computer with this internal ram upgrade solves all of these problems and makes an interesting one night project for the computer hobbyist.

There are only five parts required for this project. Two 8K ram chips, one address decoder chip, one I.C. socket and a resistor. See the parts list for the chip numbers and sources. The tools required are a 15 to 25 watt soldering iron, wire cutters or small scissors, a small flat blade screwdriver and a "solder pump" or length of de-soldering braid. A small piece of rosin core solder and 2 feet of wire-wrap or "telephone" wire will also be required to make the necessary connections.

The first step is to remove the computer from it's case. Since the experimenter can be working with one of several cases, this procedure will not be described. People working on a PC-8300 can't disconnect the keyboard from the circuit board. Be sure not to flex the connecting cable too often, it can snap off the circuit board quite easily.

The ram chip(s) on the computer's circuit board must be removed so the two new ram chips can be mounted. If you are working on a ZX-81 or TS-1000, the computer will have one or two ram chips. If there are five chips on your T-S computer the two 18 pin chips should be removed. If there are only four chips on the board, the 24 pin chip farthest away from the cassette connectors should be removed. PC-8300 owners will have to remove the four 18 pin chips if there are eight chips on the computer's board, or the 24 pin chip closest to the power connector if there are only 5 chips on the board.

It is a simple but time consuming process to remove the ram chips, the procedure is as follows. Remove all of the socketed I.C. chip's from the circuit board to prevent static damage when you are working on the P.C. board. Draw a diagram showing the chips location so they can be replaced when the soldering is complete. Turn the board component side down, and using the soldering iron and solder pump or braid, melt and remove the solder from each of the holes that the ram chip pins go through. Once all of the solder is removed, straighten out any bent pins and gently pry out the chips from the component side of the board using a key or small screwdriver.

After the original ram chips have been removed, a socket for the new ram chips must be installed. A Timex/Sinclair board has the holes for a 28 pin socket and a PC-8300 board has holes for a 24 pin socket. If these holes are filled with solder, clear them using a soldering iron and solder pump or wick. Insert the I.C. socket into the corresponding holes on the circuit board and solder all the pins from the back using rosin core solder.



## 16K continued

The new ram chips (6264LP-150) can now be installed. Bend pin numbers 2, 20, 22, 23 and 26 (also 27 and 28 for a PC-8300) of the first ram chip up about 45 degrees. Bend pin numbers 20 and 22 of the second ram chip out about 90 degrees. Press fit the second 6264 on top of the first so all of the pins except 20 and 22 are touching. Solder the 26 remaining pins together using only a small joint of solder where each pair of pins touch. Do not heat any of the pins for more than 5 or 10 seconds, any longer and you risk destroying the chip. Once the "chip stack" is complete install it in the socket on the T/S board with the notch on the end of the chips facing the edge connector. PC-8300 owners will have to install the chips so the notches face away from the power connector and with pins 1, 2, 27 and 28 overhanging the 24 pin socket.

The pins that were bent out sideways will have to be connected using short lengths of wire. See the diagram at the end of the article for the proper connections. The easiest place to find the proper signals on the board is at the computer's rear edge connector. When soldering near the fingers, be careful not to get solder on them. The 74LS138 has no socket to be mounted in. It should be mounted upside down on a bare spot on the P.C. Board with some tape or glue. The wiring to the chip will have to be done "on the fly" using lengths of wire as short as possible to keep everything neat. The resistor can be mounted directly across pins 5 and 8 of the '138. Be careful to make the proper connections since the chip is mounted upside down.

The construction of the project is now complete. Check the wiring for errors, short circuits and solder splashes. Re-install the chips that were removed in their sockets and check all the wiring and chip placement again. Re-assemble the computer, connect it to a TV and turn the computer on. If nothing happens, or there is an unusual display, turn the computer off and check again for wiring errors and short circuits.

-John Bell

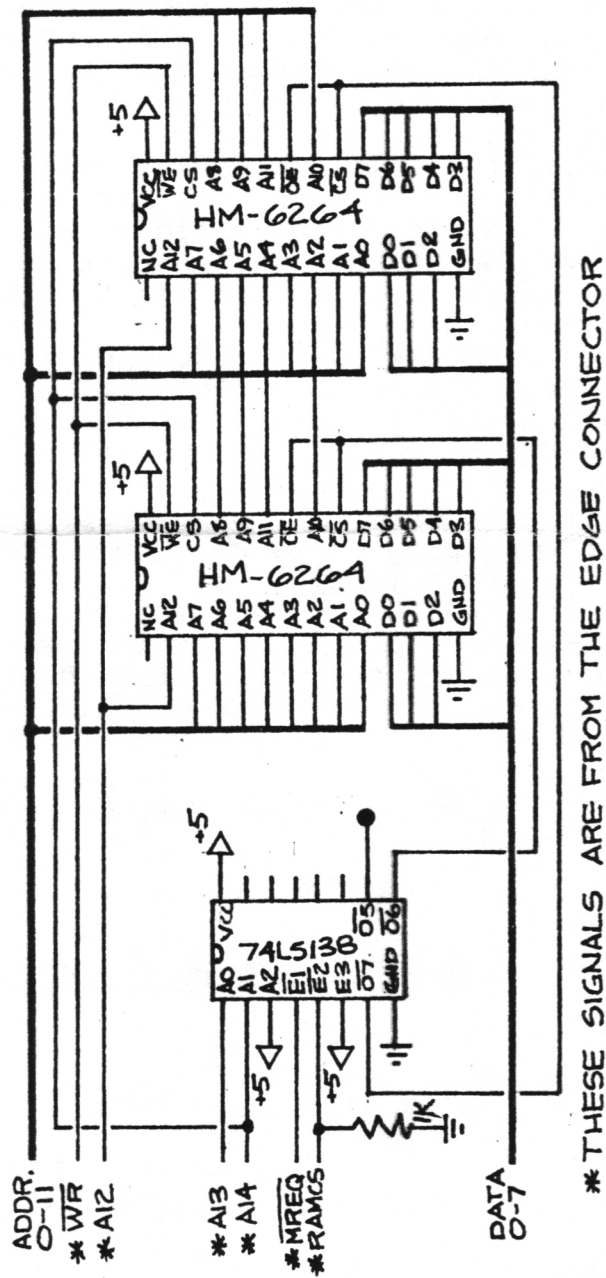
### PARTS LIST AND SUPPLIERS

- (1) 74LS138 I.C.
- (2) HM 6264LP-15 I.C.
- (1) 28 PIN SOLDER TAIL I.C. SOCKET
- OR- (see text)
- (1) 24 PIN SOLDER TAIL I.C. SOCKET
- (1) 6.8K 1/4 WATT RESISTOR

JDR MICRODEVICES, 110 Knowles Drive, Los Gatos, CA, 95030  
(800) 538-5000 -Min. Order \$10 -M.C. -VISA - GOOD SERVICE

JAMECO ELECTRONICS, 1355 Shoreway Road, Belmont, CA, 94002  
(415) 592\_8097 -Min. Order \$20 -M.C. -VISA - GOOD SERVICE

"16K Under the Hood"  
for the Zx-81



## "NEW LAMPS FOR OLD!"

or

### Running your ZX81 Basic programs on an IBM PC\*

After a few modifications, you can run most ZX81 BASIC programs on our IBM PC or clone. This article will discuss one setup of hardware, software, and "sweatware," which will do the job.

To begin with, of course, your program must be written only in BASIC. Machine code subroutines, e.g., those buried in REM's, will not run on the PC or clone, as it has a completely different set of hardware (8086 microprocessor vs. Z80, etc.). You will find, however, that the logic, and often the actual code lines of your program, will probably work under Microsoft BASIC.

As a practical example, I have taken a 168 line program (about 4K of code), which I use at work and downloaded it to a PC. Of the 168 lines, only about 10 required "pre-editing" before being accepted by MS BASIC, another 15 or so needed syntax changes, and about a dozen graphic statements (PLOT's) needed to be converted (to DRAW's). I had been running the program, which calculates label sizes for my company's products, but found the setup of the ZX81, just for this one program, a trifle tedious. Further, as others in the office all had PC's on their desks, it seemed to make more sense to move the software to their machines than set up the ZX81 each time it was needed.

Assuming your ZX81 program is all BASIC then, let us look at the uploading process. ZX81 files are stored in Sinclair BASIC, which uses non-standard character codes. Our first job, then, is to convert the text of the program to ASCII. Most ZX'ers probably already have hardware and software to do that. The hardware is the TS2068 (TIMEX) and the software is the Public Domain program FIRSTLOADR (also sold as UPLOAD 2000). The program and a detailed description of its use can be found in the January 1985 issue of SYNTAX magazine. Briefly, FIRSTLOADR, is loaded into the 2068, the ZX81 BASIC program is then loaded in after executing a USR call to the MC (Machine Code) portion of FIRSTLOADR. The process takes some time, and loading levels are quite twitchy (remember you are loading a ZX81 tape into the TS2068's circuits). At this point, as I am sure most readers know, you will have an uploaded program but it probably will not run correctly. This is because of some syntax differences between ZX81 BASIC and 2068 BASIC. These are not terribly serious, but do take time

\*IBM PC is a trademark of IBM. In this article we include clones under the generic use of the term PC.

("sweatware") to find and correct. Since we are trying to get our program to run on an IBM PC, there is really no point in making any corrections to the listing at this stage. Save the program several times to tape.

Now things get a little tougher. We have an uploaded BASIC file which is now in ASCII format, but we still have not transferred it into the PC. One very standard way to do this is to use an RS232 port. There are a number of different implementations of these ports, but for our purposes, we will discuss the use of the Sinclair Interface One (IF1).

Again, since we really do not care whether the program runs at this stage, the differences between ZX Spectrum BASIC and 2068 BASIC are moot. Simply load the previously saved 2068 program into your SPECTRUM (this can be the same 2068 outfitted with a twistor and IF1), and enter the following in direct mode:

```
FORMAT "t" ; 110
OPEN #3    ; "t"
```

These commands will set your "t" channel up to transmit the program to the PC as a text file. We will use LLIST to do this, so you will lose any hidden variables and arrays. If your program has a lot of these you will have to use the "b" channel. This can be set up the same way but will require some fancy software at the other end, to recover the variables. Such a program is beyond the scope of this article. Rest assured, however, that it can be done. The MS BASIC program to do so would have to discount the systems variables area and the program variables, since both can contain "illegal" ASCII characters (like 26, or Control Z), which can make even EDLIN (IBM's line editor) go crazy.

The "Spectrum" end of your "London Bridge" is now ready to go, but the bridge itself is going to require some finagling. Sinclair Research, in their infinite wisdom, has made their RS232 port a non-standard DTE (Data Terminal) port. The IBM PC's ASYNC card is also configured as DTE. This means that both systems are set up to talk to Modem's but not other terminals. To get around this problem, we need a "null-modem." This is a device which, simply put, "twists" the communication lines so that the receiving line of one device (RD) is connected to the transmit (TD) line of the other. Some handshaking lines are also switched in the null modem adapter.

With a null modem adapter on the end of your IF1 cable, you might think you are all set, however, at this point you have probably noticed that both the PC and your cable end



have male plugs (pins instead of sockets). The next item you will need is a F-to-F DB25 "gender changer." These are wired straight through and can be obtained from a number of supply houses, or home made. (Just a hint, buying the parts to make a F-to-F adapter from Radio Shack is not cost effective. Gender changers can be bought for as little as \$4.00 (Computer Expert in NYC) whereas RS sells the bare female connectors (you need two) for \$2.29 each. A better deal here is to build the null-modem and gender adapter into one shell).

Under normal circumstances, your hardware connections should be complete at this point. However, if you plug the adapter and cables together, you will probably find that, even at 110 BPS, you get garbled transmission, or none at all. In my first attempt this occurred primarily because my null-modem was of the non-handshaking type.

One more adapter, to the rescue. This third little hardware helper is an item called a "test adapter." Quite frankly, I bought this item simply because I did not know what it did. It is a very simple device which passes all the RS232 lines thru, but also references them all to ground thru diodes. In effect, it provides a "logic" circuit that lets you get away with some sloppy handshaking procedures. Rough schematics for all three adapters are shown in Figure 2. Note that while I used 3 separate adapters, all three could be built into one shell or a small project box.

To upload your program, all that is left is some communications and file handling software at the PC end. If you have access to a package like crosstalk, PC talk or smatcom, then you need only load and run those. If not, the short MS BASIC program below will do the job (Enter this program into your PC in BASIC).

```

10 CLS
20 DEFINT A-Z
30 OPEN "com1:110,N,8,1" AS #1
40 COM(1) ON
50 OPEN "a:program" FOR OUTPUT AS #2
60 CLS: LOCATE,,1
70 PRINT "Working
80 ON COM(1) GOSUB 150
90 PRINT "Loading block: ";L

100 IF L>40 THEN 120
110 GOTO 60
120 CLOSE #1
130 CLOSE #2
140 END
150 LET L=LOC(1)
160 AS=INPUT$(1, #1)
170 PRINT #2,AS;
180 RETURN

```

This program is admittedly crude (no error or EOF trapping) but it will put your file onto an MS DOS formatted diskette, as an ASCII file.

To make the actual transfer:

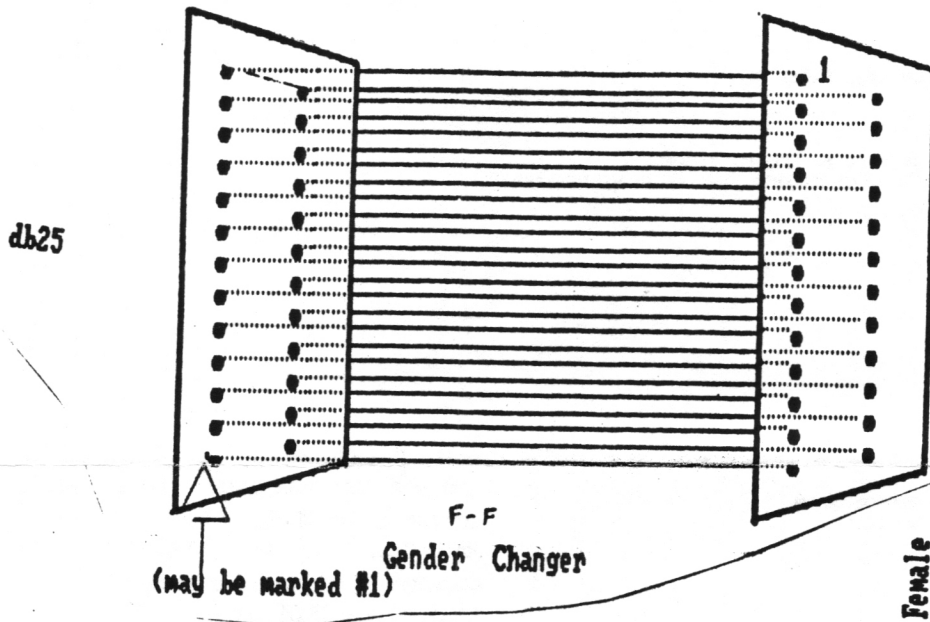
1. Run the program on your PC.
2. If it stops with a "Device Timeout" error, simply run it again.
3. Make sure you have a formatted diskette in Drive A:
4. Enter LLIST on your "Spectrum."
5. Watch the Spectrum screen. When data transfer is complete (this can take ten minutes for a 4 - 5 K program), you will get the  $\emptyset$  O.K. message. The disk drive on your PC will come on and go off several times during the transfer, as it adds blocks of data to the file.
6. Close #1 and Close #2 on your PC.
7. Type SYSTEM on your PC.
8. Type Dir. You should see the temporary file "TEMP" listed. The byte count should be close to the number of bytes in your Spectrum program (do a header reader on the 2068 version as a cross check).
9. The big moment has arrived. Type in:  
Type TEMP and enter it. You should see a listing of the ASCII file which looks like a worable BASIC program.
10. Begin editing of the TEMP file. From DOS, get your EDLIN utility (or other similar program - even some word processors will work) and look for blank lines. Put REM on the line after the line #, or simply delete it. Also look for CR/LF's (carriage return/line feeds) in the middle of long text lines. This will be interpreted as "Direct Statements" in your file and rejected by the MS BASIC interpreter. Get rid of these and you are ready to test the file in BASIC.
11. After exiting from EDLIN, copy the program as a BASIC file:  
Copy      TEMP      TEMP BAS
12. Enter BASIC again
13. Load "TEMP." The program will probably load at this stage. If not, an error message should tell you what to look for.
14. Try to run the program. You will get syntax errors if you have statements like Print AT, PLOT, PAUSE or use graphics characters. Edit these to conform to MS BASIC (use LOCATE for PRINT AT; DRAW, for PLOT, etc.). You will find graphics especially annoying since Microsoft uses the silly "upside down" Y axis convention.
15. Keep editing and running your program. Make frequent saves (TEMP1, TEMP2,.....TEMP50), so that you can recover from fatal changes. I have

found that most math functions and logical operators work fine. Watch out for PI, you must specify it to MS BASIC (PI=3.141533) as it is not built in. "Before" and "After" sections of my label program are included in Figure 3.

And that is it. You should now have that ZX81 program running on your PC or clone. In fact, you may even find that, as you review the logic of your original program, it may improve during the translation process. A final, result which to many of us is better than what we would get from rubbing a lamp.

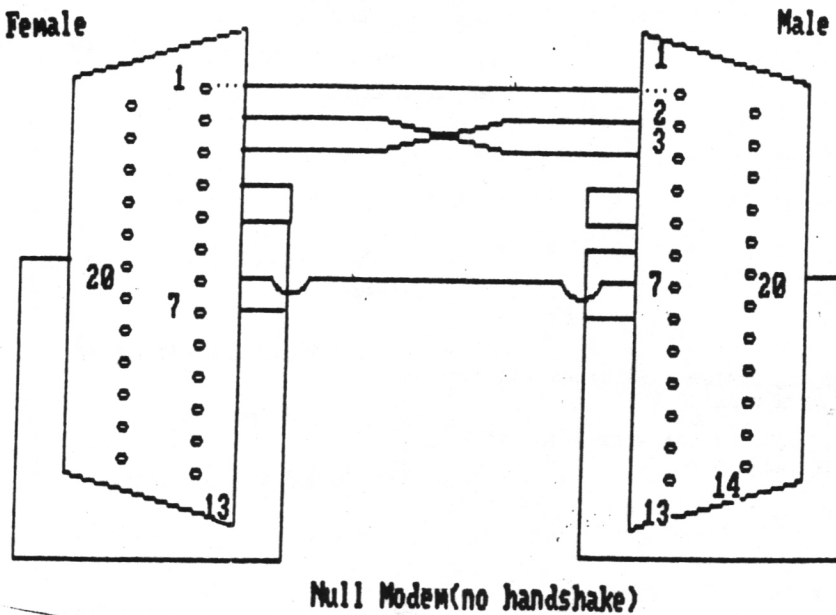
©1987

Paul Donnelly

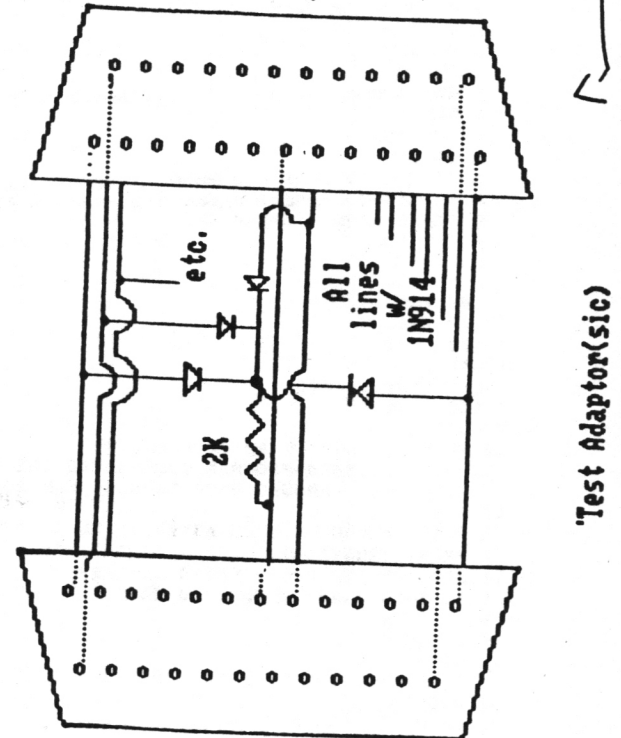


db25

All pins straight through...  
Each but #7 (ground),  
tied together with  
1N914 diodes to a  
common 2K resistor  
which goes to system ground.



Male



"NW"  
NECK WRAP PROGRAM

"New Lamps for Old"  
examples of program during  
various stages of transfer  
from ZX-81 to IBM-PC.

```
1 LET A=28.6
2 LET B=50.8
3 LET C=36.11
4 LET D=53.83
5 PRINT ""
6 LET F=25.4
7 CLS
8 SLOW
9 PRINT AT 4,5;"NECK WRAP CALCULATION"
15 PRINT " THIS PROGRAM CALCULATES THE MECHANICAL DESIGN PARAMETERS
FOR WRAP-AROUND NECK LABELS, FOR BOTTLES WITH TAPERED NECKS."
17 PRINT
20 PRINT " YOU WILL BE ASKED TO ENTER THE DIMENSIONS OF THE NECK AREA
( A FRUSTRUM). THE PROGRAM WILL CALCULATE LABEL SIZE."
21 PRINT
```

This is the original TS1000  
program.

```
22 PRINT " TO BEGIN PRESS ANY KEY"
24 IF INKEY$<>" " THEN GOTO 29
25 GOTO 24
29 GOSUB 695
30 GOSUB 900
31 PRINT "DO YOU WANT TO WORK IN METRIC(M) OR ENGLISH(E) UNITS?"
32 PRINT
33 PRINT "ENTER E OR M",
34 INPUT E$
35 IF E$="E" THEN PRINT "WE'LL USE ENGLISH UNITS(I.E. DECIMAL INCHES)"
36 IF E$="M" THEN PRINT " METRIC MEASUREMENTS MUST BE IN MILLIMETERS"
37 IF E$<>"M" AND E$<>"E" THEN GOTO 33
38 PAUSE 240
39 CLS
```

```
1 LET A=28.6
2 LET B=50.8
3 LET C=36.11
4 LET D=53.83
5 PRINT ""
6 LET F=25.4
7 CLS
8 REM
9 PRINT AT 4,5;"NECK WRAP CALCULATION"
15 PRINT " THIS PROGRAM CALCULATES THE MECHANICAL DESIGN PARAMETERS FOR
16 PRINT "WRAP-AROUND NECK LABELS, FOR BOTTLES WITH TAPERED NECKS."
17 PRINT
20 PRINT " YOU WILL BE ASKED TO ENTER THE DIMENSIONS OF THE NECK AREA( A FRUSTRUM);
```

```
21 PRINT "THE PROGRAM WILL CALCULATE LABEL SIZE."
22 PRINT " TO BEGIN PRESS ANY KEY"
24 IF INKEY$<>" " THEN GOTO 29
25 GOTO 24
29 GOSUB 695
30 GOSUB 900
31 PRINT "DO YOU WANT TO WORK IN METRIC(M) OR ENGLISH(E) UNITS?"
32 PRINT
33 PRINT "ENTER E OR M",
34 INPUT E$
35 IF E$="E" THEN PRINT "WE'LL USE ENGLISH UNITS(I.E. DECIMAL INCH)"
36 IF E$="M" THEN PRINT "METRIC MEASUREMENTS MUST BE IN MILLIMETERS"
37 IF E$<>"M" AND E$<>"E" THEN GOTO 33
38 REM PAUSE 240
39 CLS
```

The same program after upload  
to the Timex 2068.

Note that there is no "SLOW"  
command, so line 8 is invalid  
Also, while PLOT works on the  
2068, the drawing will be  
quite a bit smaller due to  
increased resolution.

Note also the LF (line feed)  
after line 20. This will bomb  
out in MSBASIC.

```
1 LET A=28.6
2 LET B=50.8
3 LET C=36.11
4 LET D=53.83
5 LET PI=3.141593
6 LET F=25.4
7 CLS
8 PRINT "NECK WRAP CALCULATION"
15 PRINT " THIS PROGRAM CALCULATES THE MECHANICAL DESIGN PARAMETERS FOR "
16 PRINT "WRAP-AROUND NECK LABELS, FOR BOTTLES WITH TAPERED NECKS."
17 PRINT
20 PRINT " YOU WILL BE ASKED TO ENTER THE DIMENSIONS OF THE NECK AREA( A "
21 PRINT "FRUSTRUM). THE PROGRAM WILL CALCULATE LABEL SIZE."
22 PRINT " TO BEGIN PRESS ANY KEY"
24 IF INKEY$<>" " THEN GOTO 29
25 GOTO 24
29 GOSUB 695
30 GOSUB 900
31 PRINT "DO YOU WANT TO WORK IN METRIC(M) OR ENGLISH(E) UNITS?"
32 PRINT
33 PRINT "ENTER E OR M",
34 INPUT E$
35 IF E$="E" THEN PRINT "WE'LL USE ENGLISH UNITS(I.E. DECIMAL INCH)"
36 IF E$="M" THEN PRINT "METRIC MEASUREMENTS MUST BE IN MILLIMETERS"
37 IF E$<>"M" AND E$<>"E" THEN GOTO 33
38 REM PAUSE 240
39 CLS
```

Finally, adjusted for the PC.  
Changes are:

5. Explicit definition of PI.
8. Line 8 Removed.
10. "Print At" not valid.
20. EDLIN to remove LF.
- 20.-22. Number of characters/  
line adjusted.
38. There is no PAUSE command  
in MSBASIC.